BIOLOGY 211: HUMAN ANATOMY & PHYSIOLOGY \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

**GROSS ANATOMY OF THE MUSCULAR SYSTEM**

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Reference: Saladin, KS: Anatomy and Physiology, The Unity of Form and Function, 8th ed. (2018)

**Be sure you have read and understood Chapters 10 and 11 before beginning this lab.**

**INTRODUCTION**

 We will use a number of lab periods to learn the names of the muscles which comprise the human muscular system. There will not be step-by-step instructions: instead, it will be an independent study exercise in which you can proceed at your own pace, using your Saladin textbook (Chapter 10, Atlas B) as a reference. Study the diagrams in your textbook, the models of the arm and leg muscles, and the cadaver to learn the names of the muscles listed below. These are only a fraction of the muscles found in the human body, but they are the largest and most important for our purposes.

 Pay attention to the names of the muscles - these often tell you their functions (e.g. the *extensor digitorum* extends the digits), their locations (e.g. the *infraspinatus* is inferior to the spine of the scapula) or their origins and insertions (e.g. the *sternocleidomastoid* originates from the sternum and clavicle and inserts onto the mastoid process of the temporal bone). Many muscles have similar names, so be careful with spelling.

 Muscles are grouped according to location and/or function, and you should also pay attention to these groupings. They are not random - they will often help you learn the muscle names (e.g. many of the muscles in the *anterior compartment* of the forearm start with the name *flexor,* and none in this group will ever begin with the name *extensor*), and muscles in the same group often share origins or insertions. Some muscles form functional groups within a region of the body; for example the semitendinosus, semimembranosus and biceps femoris form the *hamstrings* on the posterior thigh. You need to know both the individual muscles and the groups as listed on the following pages. This grouping will vary somewhat from the way in which the muscles are grouped in your textbook, but you should understand the groupings as listed below. You will also be expected to learn the origin, insertion, and function of one muscle from each group listed below.

 ***Be sure to look at the whole muscle (including its tendons) when identifying it or when relating its structure and position to its function.*** For example: What size is it? (smaller muscles typically provide more fine movement than do larger ones). What shape is it? (a broad, flat muscle can pull on a wider area than a narrow one). What direction do its fibers run? (this tells you the direction of pull). Where do its tendons lead? (if they lead to the fingers, then the muscle probably moves the fingers).

 Many muscles can also be felt through the skin. On yourself and/or another person, locate each of the living muscles as you cause them to contract. For example, you can feel the contraction of your biceps brachii muscle when you flex your elbow against resistance, or contraction of your sternocleidomastoid muscle when you flex your neck against resistance. Many of these will require the removal of clothing and should, obviously, not be done in the lab. Do not attempt to identify muscles through clothing. You will need to use your textbook to identify the specific function of each muscle in order to contract it. For example, different joints in the fingers are flexed by the flexor digitorum profundus and flexor digitorum superficialis.

**MUSCLES OF FACIAL EXPRESSION:**

 These muscles typically originate from the bones of the face and insert into the skin of the scalp or face. Thus, they move skin, not bones, when they contract. Because they have a very extensive nerve supply through the seventh cranial (facial) nerve, you have fine control of their contraction.

**IDENTIFY THE FOLLOWING MUSCLES ON FIGURE 10.8 OF YOUR SALADIN TEXT:**

 Frontalis

 Occipitalis

 Orbicularis oculi

 Orbicularis oris

 Depressor anguli oris

 Depressor labii inferioris

 Mentalis

 Zygomaticus major

 Zygomaticus minor

 Buccinator

Select one muscle from the list above and be ready to discuss its origin, insertion, and function.

**MUSCLES OF MASTICATION:**

 These muscles, as their name implies, move your mandible when you chew. They are bilateral (found on each side of the face).

**IDENTIFY THE FOLLOWING MUSCLES ON FIGURES 10.8 & 10.10 OF YOUR TEXT:**

 Masseter

 Temporalis

Medial pterygoid

Lateral pterygoid

Select one of these four muscles and be prepared to discuss its origin, insertion, and function.

**MUSCLES OF THE ANTEROLATERAL NECK:**

 These muscles are grouped together because of their location on the front of the neck.

**IDENTIFY THE FOLLOWING MUSCLES ON FIGURE 10.11 OF YOUR TEXT:**

 Sternocleidomastoid\*

 Digastric

 Omohyoid\*

 Sternohyoid\*

Identify the 3 muscles marked with an asterisk (\*) on the muscle model of the torso

Select one muscle from this list above and be ready to discuss its origin, insertion, and function.

**MUSCLES OF THE THORAX AND SHOULDER:**

 The intercostal muscles move the ribs relative to each other; the other muscles on this list are involved with movement of the upper limb (including the scapula). Many of them also function to anchor the scapula in position to provide a stable platform for movement of the humerus. We see a pattern of layers, with some located deep to other muscles.

**IDENTIFY THE FOLLOWING MUSCLES ON FIGURES 10.15, 10.17, and 10.23 OF YOUR TEXT:**

 Pectoralis major\*

 Pectoralis minor

 Deltoid\*

 Trapezius\*

 Latissimus dorsi

 Supraspinatus

 Infraspinatus

 Rhomboid major

 Rhomboid minor

Identify the 3 muscles marked with an asterisk (\*) on the muscle model of the torso

Select one muscle from the list above and be ready to discuss its origin, insertion, and function.

**MUSCLES OF THE ARM:**

 Anatomically, the *arm* extends only from the shoulder to the elbow. Muscles located here move (or stabilize) the arm if they cross the shoulder joint, and move (or stabilize) the forearm if they cross the elbow joint. They have relatively long tendons where they cross joints.

**IDENTIFY THE FOLLOWING MUSCLES ON FIGURE 10.23 OF YOUR TEXT**. Be sure you understand which is an anterior view and which is a posterior view of these muscles.

 Triceps brachii\*

 Biceps brachii\*

 Brachialis

 Coracobrachialis\*

Identify the 3 arm muscles marked with an asterisk (\*) on the model of the upper limb

Select one muscle from this list and be prepared to discuss its origin, insertion, and function.

**MUSCLES OF THE FOREARM:**

 Anatomically, your *forearm* extends from the elbow to the wrist. Most of the muscles located here move the hand or the fingers. They tend to be long and spindle-shaped with long tendons reaching toward their insertions. For reasons of both location and function, we divide them into two groups located in the *anterior (flexor)* and *posterior (extensor)* compartments of the forearm. Within both compartments, some muscles lie deep to others and can only be seen by moving the superficial ones out of the way - be sure you understand this arrangements of muscles into layers as shown in your textbook.

**IDENTIFY THE FOLLOWING MUSCLES IN THE *ANTERIOR COMPARTMENT* OF THE FOREARM ON FIGURE 10.28 OF YOUR SALADIN TEXT.**

 Brachioradialis\*

 Palmaris longus\*

 Flexor carpi radialis\*

 Flexor carpi ulnaris\*

 Flexor digitorum superficialis\*

 Flexor digitorum profundus

 Flexor pollicis longus

**IDENTIFY THE FOLLOWING MUSCLES IN THE *POSTERIOR COMPARTMENT* OF THE FOREARM ON FIGURE 10.29 OF YOUR SALADIN TEXT.**

 Extensor carpi ulnaris\*

 Extensor digitorum\*

 Extensor pollicis longus

 Abductor pollicis longus

 Extensor indicis

Identify the 7 forearm muscles marked with an asterisk (\*) on the model of the upper limb

Select one muscle listed from ***each*** of the two compartments of the forearm and be prepared to discuss the origin, insertion, and function of each of these muscles.

**MUSCLES OF THE ABDOMINAL WALL:**

 These broad, flat muscles provide shape to, and movement of, the walls of the abdomen. Three muscles form the lateral abdominal wall, arranged on top of each other, and they share anterior insertions where the fourth one lies. Be sure you study the diagrams and text enough to understand where these various muscles are located relative to each other, and which ones must be removed or reflected to identify muscles underneath them.

**IDENTIFY THE FOLLOWING MUSCLES ON FIGURE 10.15 OF YOUR SALADIN TEXT**:

 External oblique\*

 Internal oblique\*

 Transversus abdominus\*

 Rectus abdominus\*

Identify these 4 muscles marked with an asterisk (\*) on the muscle model of the torso

You do not need to identify origin, insertion, or function for any of these abdominal muscles

**MUSCLES OF THE THIGH:**

 These muscles move both your thigh and (lower) leg and are very important in holding you upright and in balance when you stand or walk. They tend to be large and strong. Similar to the arrangement in the arm, we divide these muscles into compartments based on both their location and similar functions. Here again, some of these muscles lie deep to other muscles and can only be seen by moving the superficial muscles out of the way, Be sure you understand this arrangement.

**IDENTIFY THE FOLLOWING MUSCLES IN THE *ANTERIOR COMPARTMENT* OF THE THIGH ON FIGURE 10.35 OF YOUR SALADIN TEXT.**

 Sartorius\* Quadriceps Femoris group:\*

 Rectus femoris\*

 Vastus lateralis\*

 Vastus medialis\*

 Vastus intermedius

**IDENTIFY THE FOLLOWING MUSCLES IN THE *MEDIAL COMPARTMENT* OF THE THIGH ON FIGURES 10.32 & 10.35 OF YOUR SALADIN TEXT.**

 Adductor magnus\*

 Adductor longus\*

 Gracilis\*

 Pectineus\*

**IDENTIFY THE FOLLOWING MUSCLES IN THE *POSTERIOR COMPARTMENT* OF THE THIGH ON FIGURE 10.33 OF YOUR SALADIN TEXT.**

 Gluteus maximus\*

 Gluteus medius\*

 Hamstrings group:\*

 Biceps femoris\*

 Semitendinosus\*

 Semimembranosus\*

Identify the 2 groups and 14 thigh muscles marked with an asterisk (\*) on the model of the lower limb

Select one muscle listed for ***each*** of the three compartments of the thigh and be prepared to discuss the origin, insertion, and function of each.

**MUSCLES OF THE LEG:**

 Anatomically, your *leg* lies between you knee and your ankle. These long, spindle-shaped muscles help move and/or stabilize the leg, but they also have long tendons of insertion to reach the foot or toes. As in the forearm and thigh, they are divided into compartments based both on location and on similar functions, and some muscles will lie deep to others.

**IDENTIFY THE FOLLOWING MUSCLES IN THE *POSTERIOR COMPARTMENT* OF THE LEG ON FIGURES 10.38 & 10.39 OF YOUR SALADIN TEXT.**

 Gastrocnemius\*

 Soleus\*

 Tibialis posterior

 Flexor digitorum longus

 Flexor hallucis longus

**IDENTIFY THE FOLLOWING MUSCLES IN THE *ANTERIOR COMPARTMENT* OF THE LEG ON FIGURE 10.37 OF YOUR SALADIN TEXT**

 Tibialis anterior\*

 Extensor digitorum longus\*

 Fibularis (Peroneus) longus

Identify the 4 leg muscles marked with an asterisk (\*) on the model of the lower limb

Select one muscle listed for ***each*** compartment of the leg and be prepared to discuss its origin, insertion, and function.

**MUSCLES ON THE CADAVER**:
After studying the muscles using diagrams and models, identify the following muscles on the cadaver in the supine (face up) position:

 Pectoralis major
 Pectoralis minor
 Deltoid
 Biceps brachii
 Triceps brachii
 Flexor carpi ulnaris
 Flexor carpi radialis
Flexor digitorum superficialis
Extensor carpi ulnaris
Extensor digitorum of upper limb
Rectus femoris
Vastus lateralis
Vastus medialis
Sartorius